

US010860100B2

(12) United States Patent Osterhout et al.

(54) AR GLASSES WITH PREDICTIVE CONTROL OF EXTERNAL DEVICE BASED ON EVENT INPUT

(71) Applicant: Microsoft Technology Licensing, LLC, Redmond, WA (US)

(72) Inventors: Ralph F. Osterhout, San Francisco, CA (US); John D. Haddick, Mill Valley, CA (US); Robert Michael Lohse, Palo Alto, CA (US)

(73) Assignee: Microsoft Technology Licensing, LLC, Redmond, WA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 268 days.

(21) Appl. No.: 15/433,757

(22) Filed: Feb. 15, 2017

(65) Prior Publication Data

US 2017/0168566 A1 Jun. 15, 2017

Related U.S. Application Data

- (63) Continuation of application No. 14/740,710, filed on Jun. 16, 2015, which is a continuation of application (Continued)
- (51) **Int. Cl.** *G06F 3/0481* (2013.01) *G06F 3/0488* (2013.01)
 (Continued)

(Continued)

(10) Patent No.: US 10,860,100 B2

(45) **Date of Patent:**

Dec. 8, 2020

(58) Field of Classification Search

CPC G02B 27/017; G02B 2027/0187; G06F 3/011; G06F 3/017 See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

3,152,215 A RE27,356 E 10/1964 Barstow et al. 5/1972 La Russa (Continued)

FOREIGN PATENT DOCUMENTS

CN 1607884 A 4/2005 CN 101243392 A 8/2008 (Continued)

OTHER PUBLICATIONS

ISA European Patent Office, International Search Report and Written Opinion Issued in Application No. PCT/US2011/026558, dated Aug. 11, 2011, WIPO, 8 pages.

(Continued)

Primary Examiner — Jordany Nunez (74) Attorney, Agent, or Firm — Alleman Hall Creasman & Tuttle LLP

(57) ABSTRACT

This disclosure concerns an interactive head-mounted eyepiece with an integrated processor for handling content for display and an integrated image source for introducing the content to an optical assembly through which the user views a surrounding environment and the displayed content, wherein the eyepiece includes predictive control of external device based on an event input.

19 Claims, 121 Drawing Sheets

